Click here for previous

clover were sensitive. The safener, NA, did not influence the response of wheat, barley or maize.

Although some interesting selectivities are apparent in certain crops e.g. the control of A. myosuroides in wheat and barley, gaps in the weed spectrum are apparent, so this compound will need to be augmented with another herbicide. However, more pre-emergence activity and selectivity was found than expected. The type of symptoms produced by tridiphane suggests that its mode of action differs from atrazine, the herbicide with which tridiphane is recommended in mixture. This could be advantageous in regard to weeds not controlled, or which have become resistant to atrazine.

TRIAL NUMBER 533

TRIDIPHANE

SPECIES	0.13 kg/ha		0.50 kg/ha		2.00 kg/ha	
WHEAT	85	xxxxxxxxxxxxxxxxx	104	xxxxxxxxxxxxxxxxxxxx+	98	xxxxxxxxxxxxxxxxxxx
(1)	100	xxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx	50	xxxxxxxxxx
WHEAT+S	107	xxxxxxxxxxxxxxxxxxx+	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(2)	100	xxxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxx	43	xxxxxxxxx
BARLEY	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(3)	100	xxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx	57	xxxxxxxxxx
BARLEY+S	102	xxxxxxxxxxxxxxxxxxx	102	xxxxxxxxxxxxxxxxxxx	102	xxxxxxxxxxxxxxxxxxx
(4)	100	xxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx	57	xxxxxxxxxx
OAT	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	94	xxxxxxxxxxxxxxxxxx
(5)	93	xxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx	43	xxxxxxxxx
PER RYGR	32	xxxxxx	16	xxx	8	xx
(6)	43	xxxxxxxxx	29	xxxxxx	14	xxx
ONION	58	xxxxxxxxxxx	10	xx	5	x
(8)	57	xxxxxxxxxxx	29	xxxxxx	7	x
DWF BEAN	104	xxxxxxxxxxxxxxxxxxx+	91	xxxxxxxxxxxxxxxxx	104	xxxxxxxxxxxxxxxxxxx+
(9)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx
FLD BEAN	86	xxxxxxxxxxxxxxxxx	129	xxxxxxxxxxxxxxxxxxx+	129	xxxxxxxxxxxxxxxxxxx+
(10)	86	xxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx
PEA	71	xxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	106	xxxxxxxxxxxxxxxxxxx+
(11)	86	xxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx
W CLOVER	100	xxxxxxxxxxxxxxxxxxx	40	xxxxxxxx	0	
(12)	43	xxxxxxxxx	29	xxxxxx	0	
LUCERNE	66	xxxxxxxxxxxxx	66	xxxxxxxxxxxxx	108	xxxxxxxxxxxxxxxxxxx+
(13)	71	xxxxxxxxxxxxxx	57	xxxxxxxxxxx	43	xxxxxxxxx

Pre-emergence selectivity test

Pre-emergence selectivity test

TRIAL NUMBER 533

TRIDIPHANE

SPECIES	0.13 kg/ha		0.50 kg/ha		2.00 kg/ha	
RAPE	91	xxxxxxxxxxxxxxxxxx	102	xxxxxxxxxxxxxxxxxxx	27	xxxxx
(14)	100	xxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx	36	xxxxxxx
KALE	93	xxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	36	xxxxxxx
(15)	93	xxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	36	xxxxxxx
SWEDE	94	xxxxxxxxxxxxxxxxxx	24	xxxxx	12	xx
(17)	79	xxxxxxxxxxxxxxx	36	xxxxxxx	14	xxx
CARROT	162	xxxxxxxxxxxxxxxxxxx+	162	xxxxxxxxxxxxxxxxxxx+	92	xxxxxxxxxxxxxxxxx
(18)	100	xxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx	64	xxxxxxxxxxxx
LETTUCE	118	xxxxxxxxxxxxxxxxxx+	24	xxxxx	0	
(20)	86	xxxxxxxxxxxxxxxx	36	xxxxxxx	0	
SUG BEET	112	xxxxxxxxxxxxxxxxxx+	75	xxxxxxxxxxxxxxx	67	xxxxxxxxxxxx
(22)	79	xxxxxxxxxxxxxxx	57	xxxxxxxxxx	43	xxxxxxxxx
BETA VUL	106	xxxxxxxxxxxxxxxxxx+	59	xxxxxxxxxxx	94	xxxxxxxxxxxxxxxxxx
(23)	79	xxxxxxxxxxxxxxx	57	xxxxxxxxxx	36	xxxxxxx
BROM STE	96	xxxxxxxxxxxxxxxxxx	96	xxxxxxxxxxxxxxxxxx	89	xxxxxxxxxxxxxxxxxx
(24)	93	xxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	43	xxxxxxxxx
FEST RUB	56	xxxxxxxxxxx	0		0	
(25)	64	xxxxxxxxxxxxx	0		0	
AVE FATU	100	xxxxxxxxxxxxxxxxxx	106	xxxxxxxxxxxxxxxxxx+	94	xxxxxxxxxxxxxxxxxx
(26)	86	xxxxxxxxxxxxxxxx	57	xxxxxxxxxx	36	xxxxxxx
ALO MYOS	25	xxxxx	5	x	0	
(27)	43	xxxxxxxxx	7	x	0	
POA ANN	0		0		0	
(28)	0		0		0	

TRIAL NUMBER 533

TRIDIPHANE

SPECIES	0.13 kg/ha		0.50 kg/ha		2.00 kg/ha	
POA TRIV	12	xx	0		0	
(29)	14	xxx	0		0	
SIN ARV	109	xxxxxxxxxxxxxxxxxxxx+	62	xxxxxxxxxxxx	5	x
(30)	93	xxxxxxxxxxxxxxxxxx	50	xxxxxxxxxx	14	xxx
RAPH RAP	92	xxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxxx	61	xxxxxxxxxxxx
(31)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	43	xxxxxxxxx
CHRY SEG	137	xxxxxxxxxxxxxxxxxxx+	98	xxxxxxxxxxxxxxxxxxx	52	xxxxxxxxxx
(32)	86	xxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx	36	xxxxxxx
MAT PERF	107	xxxxxxxxxxxxxxxxxx+	83	xxxxxxxxxxxxxxxxx	52	xxxxxxxxxx
(33)	71	xxxxxxxxxxxxxx	50	xxxxxxxxxx	29	xxxxxx
SEN VULG	64	xxxxxxxxxxxxx	107	xxxxxxxxxxxxxxxxxxx+	21	xxxx
(34)	64	xxxxxxxxxxxxx	64	xxxxxxxxxxxxx	14	xxx
POL LAPA	91	xxxxxxxxxxxxxxxxx	98	xxxxxxxxxxxxxxxxxxx	108	xxxxxxxxxxxxxxxxxxx+
(35)	86	xxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx	57	xxxxxxxxxx
GAL APAR	143	xxxxxxxxxxxxxxxxxxx+	91	xxxxxxxxxxxxxxxxx	104	xxxxxxxxxxxxxxxxxxx+
(38)	100	xxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxx	50	xxxxxxxxxx
CHEN ALB	46	xxxxxxxxx	37	xxxxxxx	25	xxxxx
(39)	71	xxxxxxxxxxxxxx	50	xxxxxxxxxx	21	xxxx
STEL MED	68	xxxxxxxxxxxxxx	11	xx	0	
(40)	57	xxxxxxxxxxx	14	xxx	0	
VER PERS	111	xxxxxxxxxxxxxxxxxxx+	0		0	
(42)	100	xxxxxxxxxxxxxxxxxxx	0		0	
VI ARVE	145	xxxxxxxxxxxxxxxxxxx+	114	xxxxxxxxxxxxxxxxxxx+	114	xxxxxxxxxxxxxxxxxxx+
(43)	86	xxxxxxxxxxxxxxxx	50	xxxxxxxxxx	36	xxxxxxx

Pre-emergence selectivity test

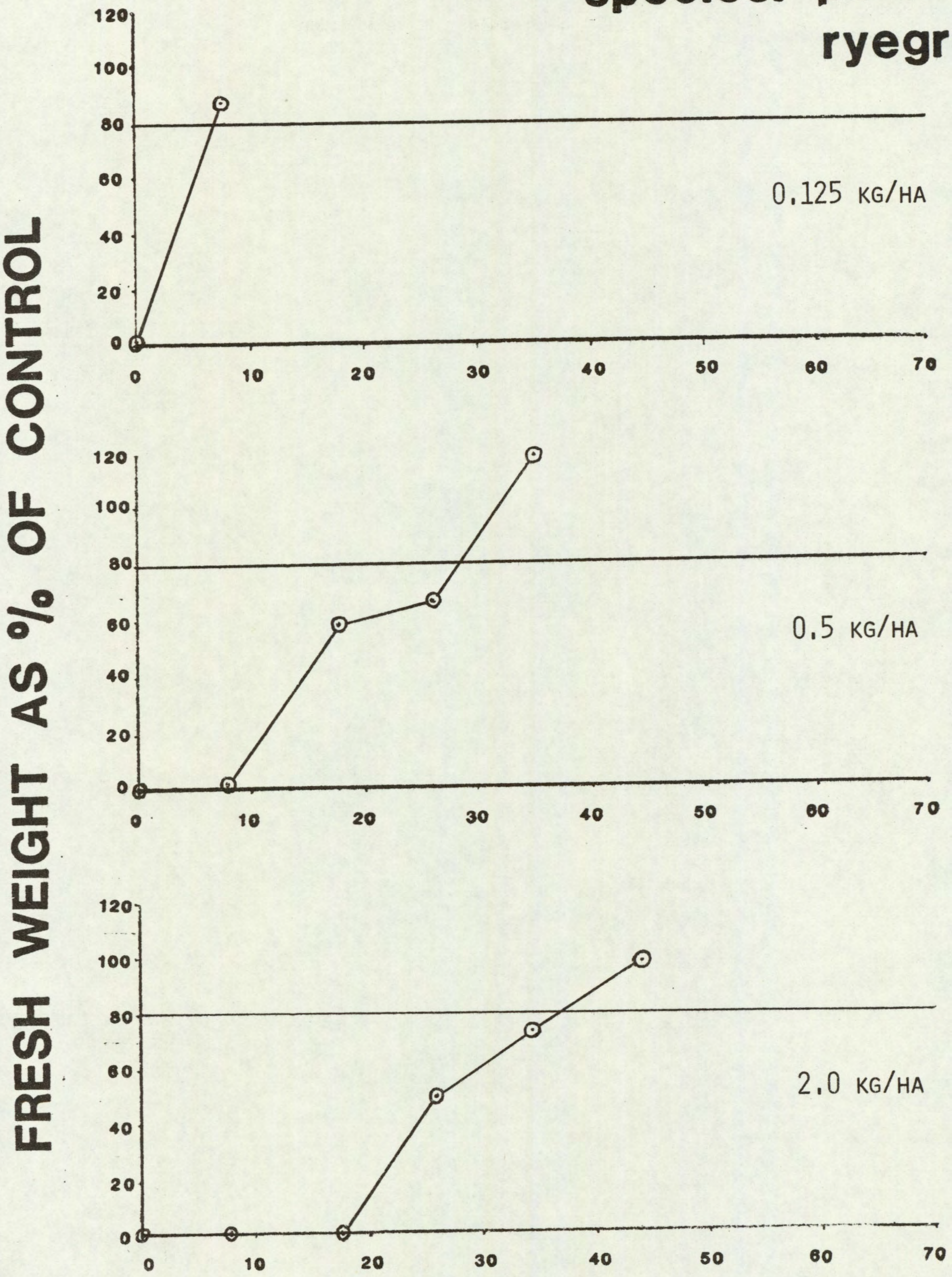
TRIAL NUMBER 533

TRIDIPHANE

SPECIES		0.13 kg/ha	0.50 kg/ha	2.00 kg/ha
RUM OBTU	91	xxxxxxxxxxxxxxxxxx	76 xxxxxxxxxxxxxxx	18 xxxx
(44)	79	xxxxxxxxxxxxxxx	43 xxxxxxxxx	21 xxxx
EL REPEN	103	xxxxxxxxxxxxxxxxxxx+	94 xxxxxxxxxxxxxxxxxx	103 xxxxxxxxxxxxxxxxxxx+
(47)	100	xxxxxxxxxxxxxxxxxx	71 xxxxxxxxxxxxxx	43 xxxxxxxxx
ALL VIN	84	xxxxxxxxxxxxxxxxx	122 xxxxxxxxxxxxxxxxxxx+	37 xxxxxxx
(49)	86	xxxxxxxxxxxxxxxxx	71 xxxxxxxxxxxxxx	29 xxxxxx
CIRS ARV	100	xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx	57 xxxxxxxxxxx
(50)	100	xxxxxxxxxxxxxxxxxxx	79 xxxxxxxxxxxxxxx	57 xxxxxxxxxxx
TUS FARF	82	xxxxxxxxxxxxxxxx	109 xxxxxxxxxxxxxxxxxxx+	109 xxxxxxxxxxxxxxxxxxx+
(51)	100	xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx
CONV ARV	171	xxxxxxxxxxxxxxxxxxx+	57 xxxxxxxxxxx	43 xxxxxxxxx
(52)	100	xxxxxxxxxxxxxxxxxx	71 xxxxxxxxxxxxx	29 xxxxxx
MAIZE+S	100	xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx
(56)	100	xxxxxxxxxxxxxxxxxxx	86 xxxxxxxxxxxxxxxx	64 xxxxxxxxxxxxx
MAIZE	100	xxxxxxxxxxxxxxxxxxx	90 xxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx
(57)	100	xxxxxxxxxxxxxxxxxxx	86 xxxxxxxxxxxxxxxxx	64 xxxxxxxxxxxxx

Pre-emergence selectivity test

PERSISTENCE OF TRIDIPHANE
species: perennial ryegrass



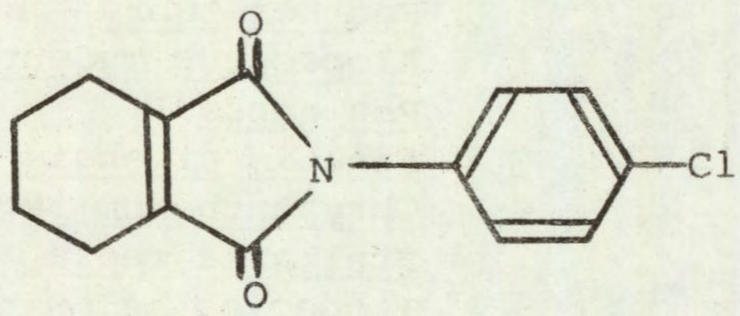
MK 616

Code number MK 616 Trade name Diamate

Common name Chlorphthalim (Japan)

Chemical name N-(4-chlorophenyl)-4,5,6,7-tetrahydrophthalimide

Structure



Source Mitsubishi Chemical Industries Limited
5-2, Marunouchi 2-chome
Chiyoda-ku
Tokyo 100
Japan

Information available and suggested uses

Pre-emergence in turf.

Formulation used: 50% a.i. wettable powder.

Spray volume: 373 l/ha

RESULTS

Full results are given in the histograms on pages 44-48 and potential selectivities are summarised in the following table.

RATE: (kg a.i./ha)	CROPS: vigour reduced by 15% or less	WEEDS: number or vigour reduced by 70% or more
4.00	maize+safener (NA)	Avena fatua Raphanus raphanistrum Galium aparine + species below
1.0	species above + radish	Bromus sterilis Festuca rubra Alopecurus myosuroides Poa annua Sinapis arvensis Chrysanthemum segetum Stellaria media + species below
0.25	maize wheat±safener (NA) oat dwarf bean pea kale carrot	Beta vulgaris Poa trivialis Matricaria perforata Senecio vulgaris Polygonum lapathifolium Chenopodium album Veronica persica Viola arvensis Rumex obtusifolius Allium vineale Convolvulus arvensis

Comments on results

Activity experiment

The foliar spray caused a rapid scorch of all species except Elymus repens, but these effects were not lethal. Broad-leaved species were somewhat more affected than grasses. With soil drenches, grasses were generally more susceptible, with some kill of perennial ryegrass at higher doses. Greatest activity was found pre-emergence, especially with perennial ryegrass, Avena fatua, kale and Polygonum amphibium. With these four species, surface applications were much more effective than when the herbicide was incorporated into the soil. Thus the spectrum of activity resembles that of a diphenyl-ether.

Symptoms on susceptible species

These were similar to those for diphenyl-ether herbicides. A moderate to severe scorch developed on sprayed leaves within a day or so of spraying. New leaf development after spraying was deformed in kale and dwarf bean. Soil drenches lead to a severe necrosis or browning along the midribs and veins of broad-leaved species. In grasses, leaf looping and trapping was evident and some leaves were shiny and lighter green in colour with necrotic patches. These latter symptoms were seen pre-emergence but a severe necrosis and die-back soon after emergence was more common at the higher doses.

Persistence in the soil

Using perennial ryegrass as test species, MK 616 was found to have a moderate period of soil persistence. Doses of 0.25 and 1.0 kg/ha were undetectable 36 weeks after treatment, but 4.0 kg/ha was still causing 56% shoot fresh weight reduction after 52 weeks.

Pre-emergence selectivity

The wide spectrum of weed control included mainly annual broad-leaved weeds at lower doses but with some grasses also at higher doses. Of the eleven weeds controlled at the lowest dose of 0.25/ha, most interesting were Veronica persica and Viola arvensis. However polygonaceous (Polygonum lapathifolium, Rumex obtusifolius) and composite weeds (Matricaria perforata, Senecio vulgaris) were also controlled. Poa trivialis was the only grass weed controlled at this dose, but four were controlled at 1.0 kg/ha including Alopecurus myosuroides and Bromus sterilis. Perennials were generally resistant except for Allium vineale, which was quite sensitive, being controlled at 0.25 kg/ha.

Crop tolerance was restricted to only a few crops. Radish was the most tolerant, withstanding 1.0 kg/ha. At 0.25 kg/ha, dwarf bean and pea were tolerant, as were kale and carrot, the latter being reduced in vigour by only 29% at 1.0 kg/ha. Cereals withstood 0.25 kg/ha, with the exception of barley. Although safening by NA was not important with wheat and barley, it was markedly so with maize, which withstood the highest dose of 4.0 kg/ha. This is in line with the discovery of Wakabayashi and Matsunaka, 1982. Many crops were very sensitive, including perennial ryegrass, onion, white clover, lucerne, swede, lettuce and sugar beet.

Although selectivity is generally low, as indicated by the manufacturers, some follow up work may be worthwhile, e.g. control of V. persica and V. arvensis in wheat, but more importantly with the safening by NA in maize. It could prove a useful alternative to triazines, its mode of action (based on symptoms produced) being different, and this could be useful where resistant weeds have been encountered. Although structurally dissimilar to diphenyl ethers, it bears many similarities with them, including the weed spectrum, with the possible exception of Stellaria media, usually resistant to most diphenyl-ethers but controlled by MK 616.

ACTIVITY EXPERIMENT

MK 616

		0.25 kg ai/ha	1.0 kg ai/ha	4.0 kg ai/ha
DWARF BEAN	F	xxxxxxxxxxxxxx xxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxx	xxxxxxxxxxxxxx xxxxxx
	S	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxx
	P	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxx
	I	xxxxxxxxxxxxxx xxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxx
KALE	F	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxx
	S	xxxxxxxxxxxxxx xxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxx	xxxxxx xxxxxxx
	P	xxxxxxxxxxxxxx+ xxxxxxxxxxxx	xxxxxxxxxxxx xxxxxxxxx	xx xxxx
	I	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx+ xxxxxxxxxxxx	xxxxxxxxxxxx xxxxxxxxx
POLYGONUM	F	xxxxxxxxxxxxxx xxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxx
	S	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxx xxxxxxxxxx	xxxxxxxxxx xxxxxxxx
	P	xxxxxxxxxxxxxx+ xxxxxxxxxxxxx	xxxxx xxxxxxxx	o o
	I	xxxxxxxxxxxxxx+ xxxxxxxxxxxxx	xxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxx xxxxxxxxxx
PERENNIAL RYEGRASS	F	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxx
	S	xxxxxxxxxxxxxx xxxxxxxxxx	xxxxxxxxxxxxx xxxxxxxx	xxxxxxx xxxx
	P	xxxx xxxx	o o	o o
	I	xxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxx xxxxxxxxx	x xxx
AVENA FATUA	F	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxx
	S	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxx xxxxxxxxxx	xxxxxxxxxxxxx xxxxxxx
	P	xxxxxxxxxxxxxx+ xxxxxxxxxxxxx	xxxxxxxxxxxxx+ xxxxxxxxx	xxx xxxx
	I	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxx	xxxxxxxxxxxxxx+ xxxxx
ELYMUS REPENS	F	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxx
	S	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxx
	P	xxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxx xxxxxxxxxxxx	xxxxxxxxxxxxx xxxxxxxxxx
	I	xxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxx xxxxxxxxxxxx	xxxxxxxxxxxxx xxxxxxx

KEY: F = post-emergence, foliar application
S = post-emergence, soil drench
P = pre-emergence, surface film
I = pre-planting, incorporated

TRIAL NUMBER 533

MK 616

SPECIES		0.25 kg/ha		1.00 kg/ha		4.00 kg/ha
WHEAT	104	xxxxxxxxxxxxxxxxxxxx+	91	xxxxxxxxxxxxxxxxxx	98	xxxxxxxxxxxxxxxxxxx
(1)	100	xxxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxx	43	xxxxxxxxx
WHEAT+S	107	xxxxxxxxxxxxxxxxxxx+	87	xxxxxxxxxxxxxxxxx	60	xxxxxxxxxxx
(2)	100	xxxxxxxxxxxxxxxxxxx	57	xxxxxxxxxx	43	xxxxxxxxx
BARLEY	94	xxxxxxxxxxxxxxxxxx	94	xxxxxxxxxxxxxxxxxx	0	
(3)	71	xxxxxxxxxxxxx	57	xxxxxxxxxx	0	
BARLEY+S	102	xxxxxxxxxxxxxxxxxxx	102	xxxxxxxxxxxxxxxxxxx	38	xxxxxxxx
(4)	71	xxxxxxxxxxxxx	64	xxxxxxxxxxxx	36	xxxxxxx
OAT	94	xxxxxxxxxxxxxxxxxx	87	xxxxxxxxxxxxxxxxx	44	xxxxxxxxx
(5)	93	xxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx	43	xxxxxxxxx
PER RYGR	24	xxxxx	0		0	
(6)	7	x	0		0	
ONION	0		0		0	
(8)	0		0		0	
DWF BEAN	104	xxxxxxxxxxxxxxxxxxx+	104	xxxxxxxxxxxxxxxxxxx+	91	xxxxxxxxxxxxxxxxxx
(9)	100	xxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx	64	xxxxxxxxxxxx
FLD BEAN	171	xxxxxxxxxxxxxxxxxxx+	86	xxxxxxxxxxxxxxxx	64	xxxxxxxxxxxx
(10)	71	xxxxxxxxxxxxx	71	xxxxxxxxxxxxx	71	xxxxxxxxxxxxx
PEA	106	xxxxxxxxxxxxxxxxxxx+	88	xxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx
(11)	86	xxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx
W CLOVER	20	xxxx	0		0	
(12)	14	xxx	0		0	
LUCERNE	12	xx	0		0	
(13)	21	xxxx	0		0	

Pre-emergence selectivity test

Pre-emergence selectivity test

TRIAL NUMBER 533

SPECIES		0.25 kg/ha		MK 616 1.00 kg/ha		4.00 kg/ha
RAPE	75	xxxxxxxxxxxxxxx	0		0	
(14)	64	xxxxxxxxxxxxx	0		0	
KALE	104	xxxxxxxxxxxxxxxxxxxx+	75	xxxxxxxxxxxxxxx	36	xxxxxxx
(15)	86	xxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	43	xxxxxxxxx
SWEDE	41	xxxxxxxxx	0		0	
(17)	57	xxxxxxxxxxx	0		0	
CARROT	104	xxxxxxxxxxxxxxxxxxxx+	92	xxxxxxxxxxxxxxxxxx	58	xxxxxxxxxxxx
(18)	93	xxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	64	xxxxxxxxxxxxx
LETTUCE	16	xxx	8	xx	0	
(20)	29	xxxxxx	21	xxxx	0	
SUG BEET	8	xx	0		0	
(22)	21	xxxx	0		0	
BETA VUL	29	xxxxxx	0		0	
(23)	57	xxxxxxxxxxx	0		0	
BROM STE	89	xxxxxxxxxxxxxxxxxx	19	xxxx	19	xxxx
(24)	50	xxxxxxxxxx	7	x	14	xxx
FEST RUB	37	xxxxxxx	0		0	
(25)	36	xxxxxxx	0		0	
AVE FATU	94	xxxxxxxxxxxxxxxxxx	65	xxxxxxxxxxxxx	24	xxxxx
(26)	71	xxxxxxxxxxxxxx	43	xxxxxxxxx	21	xxxx
ALO MYOS	84	xxxxxxxxxxxxxxxxx	54	xxxxxxxxxxx	5	x
(27)	50	xxxxxxxxxx	14	xxx	7	x
POA ANN	85	xxxxxxxxxxxxxxxxx	68	xxxxxxxxxxxxxx	49	xxxxxxxxxx
(28)	50	xxxxxxxxxx	29	xxxxxx	14	xxx

TRIAL NUMBER 533

MK 616

SPECIES	0.25 kg/ha		1.00 kg/ha		4.00 kg/ha	
POA TRIV	6	x	0		0	
(29)	7	x	0		0	
SIN ARV	78	xxxxxxxxxxxxxxxx	5	x	0	
(30)	79	xxxxxxxxxxxxxxxx	14	xxx	0	
RAPH RAP	86	xxxxxxxxxxxxxxxxxx	73	xxxxxxxxxxxxxxx	18	xxxx
(31)	100	xxxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxxx	36	xxxxxxx
CHRY SEG	46	xxxxxxxxx	26	xxxxx	7	x
(32)	50	xxxxxxxxxx	36	xxxxxxx	14	xxx
MAT PERF	0		0		0	
(33)	0		0		0	
SEN VULG	0		0		0	
(34)	0		0		0	
POL LAPA	7	x	0		0	
(35)	21	xxxx	0		0	
GAL APAR	104	xxxxxxxxxxxxxxxxxxxx+	65	xxxxxxxxxxxxx	26	xxxxx
(38)	79	xxxxxxxxxxxxxxxx	50	xxxxxxxxxx	21	xxxx
CHEN ALB	4	x	0		0	
(39)	14	xxx	0		0	
STEL MED	34	xxxxxxx	3	x	0	
(40)	50	xxxxxxxxxx	7	x	0	
VER PERS	0		0		0	
(42)	0		0		0	
VI ARVE	0		0		0	
(43)	0		0		0	

Pre-emergence selectivity test

TRIAL NUMBER 533

MK 616

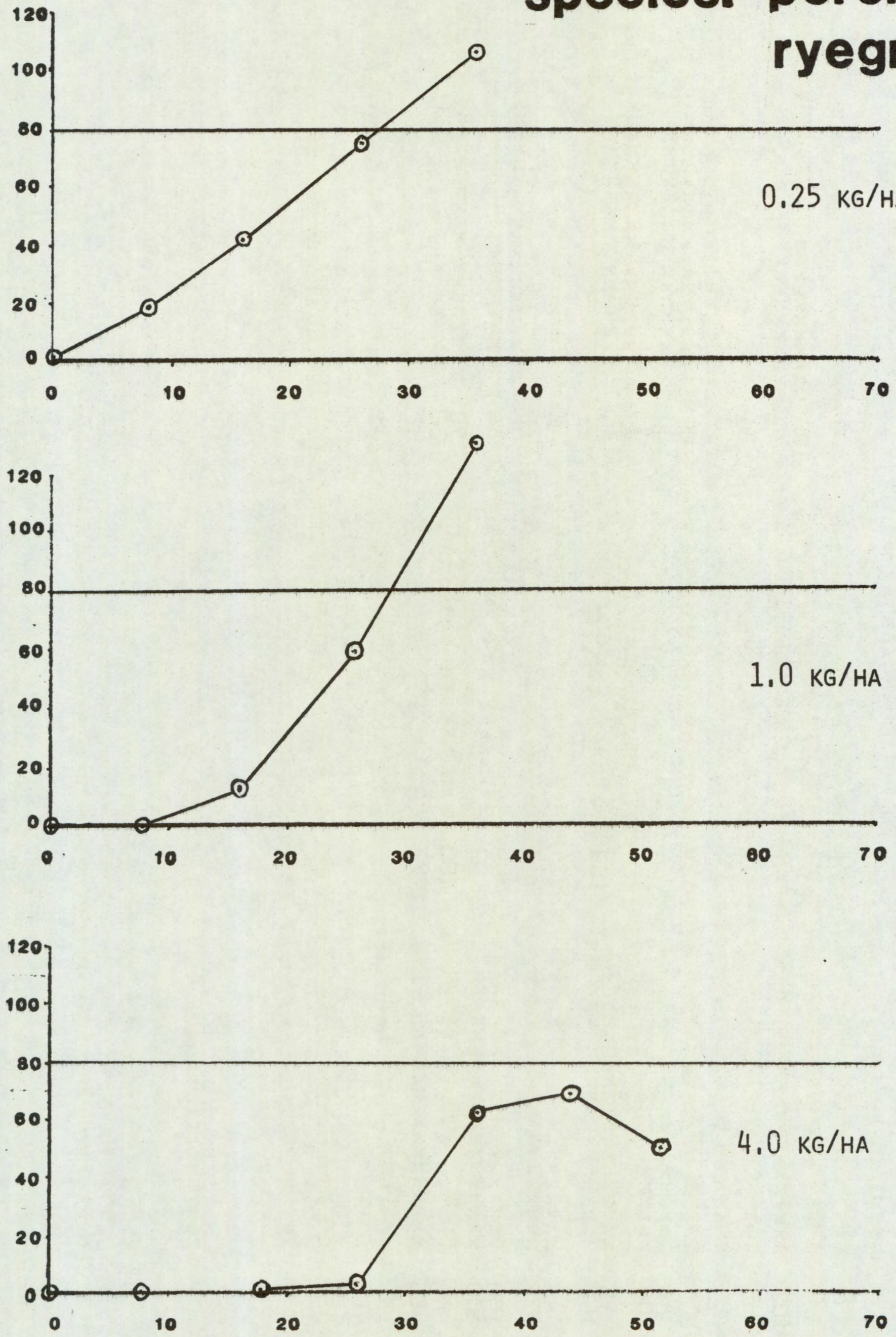
SPECIES		0.25 kg/ha		1.00 kg/ha		4.00 kg/ha
RUM OBTU	0		0		0	
(44)	0		0		0	
EL REPEN	103	xxxxxxxxxxxxxxxxxxxx+	103	xxxxxxxxxxxxxxxxxxxx+	103	xxxxxxxxxxxxxxxxxxx+
(47)	100	xxxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx
ALL VIN	19	xxxx	0		0	
(49)	29	xxxxxx	0		0	
CIRS ARV	86	xxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(50)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
TUS FARF	95	xxxxxxxxxxxxxxxxxxx	95	xxxxxxxxxxxxxxxxxxx	95	xxxxxxxxxxxxxxxxxxx
(51)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx
CONV ARV	43	xxxxxxxxx	14	xxx	0	
(52)	29	xxxxxx	14	xxx	0	
MAIZE+S	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(56)	100	xxxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx
MAIZE	90	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	90	xxxxxxxxxxxxxxxxxx
(57)	86	xxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxx	50	xxxxxxxxxx

Pre-emergence selectivity test

PERSISTENCE OF MK-616

species: perennial ryegrass

FRESH WEIGHT AS % OF CONTROL



TIME OF SOWING

weeks after treatment

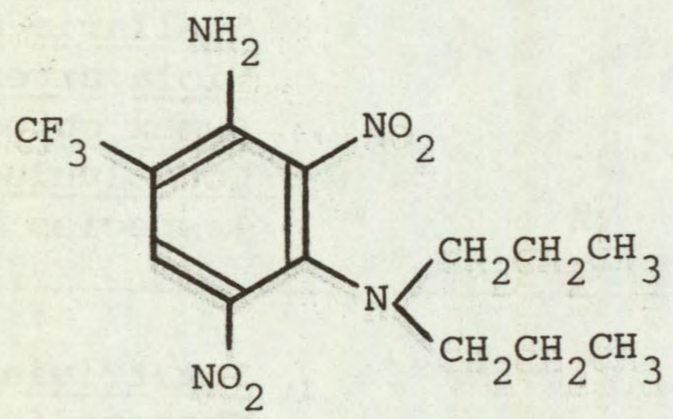
Prodiamine

Code number USB 3153
USB 5776

Trade name Rydex

Chemical name 2,6-dinitro-N',N'dipropyl-4-trifluoromethyl-m-phenylenediamine

Structure



Source Borax Consolidated Limited
Borax House
Carlisle Place
London SW1P 1HT

Agents Velsicol Chemical Co Limited
66 Tilehurst Road
Reading RG3 2JH
Berkshire
England

Information available and suggested uses

Pre-emergence incorporated for control of many annual grass and broad-leaved weeds in cotton, soyabean and possibly alfalfa, groundnut, beans, sunflower, small grain cereals (0.4 to 0.82 kg a.i./ha). In grapes, almonds, walnuts, peaches, plums and apricots at 2.0 to 4.5 kg a.i./ha.

Formulation used 50% a.i. wettable powder.

Spray volume 373 l/ha.

RESULTS

Full results are given in the histograms on pages 53-57 and potential selectivities are summarised in the following table.

RATE: (kg a.i./ha)	CROPS: vigour reduced by 15% or less	WEEDS: number or vigour reduced by 70% or more
4.0	field bean pea carrot	Beta vulgaris Festuca rubra Avena fatua Poa annua Polygonum lapathifolium Galium aparine Stellaria media Viola arvensis Rumex obtusifolius Convolvulus arvensis + species below
1.0	species above + barley±safener (NA) dwarf bean lucerne rape kale swede radish maize±safener (NA)	Poa trivialis Chenopodium album Veronica persica
0.25	None listed as no weeds controlled	None

Comments on results

Activity experiment

The foliar spray caused only minor effects on broad-leaved species, but not on grasses. Soil drenches, post-emergence, were relatively inactive, minor transient symptoms appearing at the highest dose only. Greatest activity resulted pre-emergence especially on perennial ryegrass. Incorporation into the soil, pre-emergence tended to increase activity. Dwarf bean was tolerant to the surface pre-emergence spray. Thus a similar pattern of activity to other dinitroanilines exists for prodiamine.

Symptoms on susceptible species

The foliar spray caused localized patches of chlorosis on leaves of Polygonum amphibium and dwarf bean and there was some formative effects on the trifoliates of the latter species. Soil drenches, post-emergence, led to a decrease in vigour of all species at the highest dose, leaves of P. amphibium also showing some yellowing. Higher doses pre-emergence to perennial ryegrass prevented emergence from the soil or from the coleoptile. Most species exhibited moderate to severe stunting with accompanying colour changes, varying from deeper green pigmentation to chlorosis and/or yellowing. Roots were also inhibited, often leaving plants weakly anchored in soil, the shoots of grasses assuming a dart-like appearance, because of narrow leaf blades.

Kale exhibited some swelling and twisting of stem bases and a proliferation of shortened, thickened roots protruded from the soil. These symptoms are characteristic of dinitroaniline herbicides, such as trifluralin.

Persistence in the soil

A long period of soil persistence exists. Shoot fresh weights of perennial ryegrass were reduced by 41, 72 and 82%, with 0.25, 1.0 and 4.0 kg/ha respectively, 52 weeks after treatment.

Pre-emergence selectivity

Control of several mainly annual broad-leaved weeds was achieved at higher doses. Veronica persica was the most interesting of the three weeds susceptible at 1.0 kg/ha. A further seven annual broad-leaved weeds were controlled at 4.0 kg/ha, including polygonaceous species (Polygonum lapathifolium, Rumex obtusifolius) but more interestingly, Galium aparine and Viola arvensis. Of the annual grasses, Poa species were controlled, as were Avena fatua and Festuca rubra. However some gaps are apparent in the weed spectrum, such as composites, crucifers, some grasses (Alopecurus myosuroides, Bromus sterilis) while all perennials were resistant.

Carrot and large-seeded legumes (pea, field bean at 4.0 kg/ha, dwarf bean at 1.0 kg/ha) were the most tolerant crops. Of the small seeded legumes, lucerne was tolerant but white clover was sensitive. All four brassicas withstood 1.0 kg/ha, rape being reduced in vigour by only 29% at 4.0 kg/ha. Two of the cereals (barley and maize) tolerated 1.0 kg/ha, the former being reduced in vigour by only 29% at 4.0 kg/ha. Wheat and oat were only marginally reduced at 1.0 kg/ha, the latter in fact suffering only a 21% vigour reduction at 4.0 kg/ha. No effects of the safener, NA were apparent with wheat, barley or maize.

Although some useful selectivities were found, e.g. control of V. persica in barley, consideration will have to be given to mixture with other herbicides to widen the weed control spectrum. The long period of soil persistence will assist in control of late-germinating weeds, but possible danger to subsequent crops will have to be monitored. The partial selectivity between Galium aparine and rape may be worth some further testing, at least in pots.

ACTIVITY EXPERIMENT

PRODIAMINE

		0.25 kg/ha	1.0 kg/ha	4.0 kg/ha
DWARF BEAN	F	xxxxxxxxxxxxxx xxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxx
	S	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxx
	P	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxx
	I	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxx
KALE	F	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxx
	S	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxx
	P	xxxxxxxxxxxxxx+ xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxx	xxxxxxxxxxxxxx+ xxxxxxxxx
	I	xxxxxxxxxxxxxx+ xxxxxxxxxxxxx	xxxxxxxxxxxxxx+ xxxxxxxxxxx	xxxxxxxxxxxxxx+ xxxxxxxx
POLYGONUM AMPHIBIUM	F	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxx
	S	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxx
	P	xxxxxxxxxxxxxx+ xxxxxxxxxxxxx	xxxxxxxxxxxx xxxxxxxxxxx	xxxxxxxxxxx xxxxxxxxx
	I	xxxxxxxxxxxxxx+ xxxxxxxxxxx	xxxxxxxxxxxxxx+ xxxxxxx	xxxxxxxxxxxxxx xxxxx
PERENNIAL RYEGRASS	F	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxx
	S	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxx
	P	xxxxxxxxxxx xxxxxxxxxxx	xxxxxx xxxxxxxx	xxxx xxx
	I	xxxxxxxxxxxxxx+ xxxxxxxx	xxxxxxxxxx xxxx	o o
AVENA FATUA	F	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxx
	S	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxx
	P	xxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxx xxxxxxxxxxxx
	I	xxxxxxxxxxxxxx+ xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxx	xxxxxxxxxx xxxx
ELYMUS REPENS	F	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxx
	S	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxx
	P	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx+ xxxxxxxxxxxx
	I	xxxxxxxxxxxxxx xxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxx	xxxxxxxxxxxxxx xxxxxxxx

KEY: F = post-emergence, foliar application
S = post-emergence, soil drench
P = pre-emergence, surface film
I = pre-planting, incorporated

Pre-emergence selectivity test

TRIAL NUMBER 533

PRODIAMINE

SPECIES	0.25 kg/ha		1.00 kg/ha		4.00 kg/ha	
WHEAT	98	xxxxxxxxxxxxxxxxxxx	98	xxxxxxxxxxxxxxxxxxx	91	xxxxxxxxxxxxxxxxx
(1)	100	xxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx	57	xxxxxxxxxx
WHEAT+S	107	xxxxxxxxxxxxxxxxxxx+	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(2)	100	xxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx	57	xxxxxxxxxx
BARLEY	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(3)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx
BARLEY+S	102	xxxxxxxxxxxxxxxxxxx	96	xxxxxxxxxxxxxxxxxx	102	xxxxxxxxxxxxxxxxxxx
(4)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx
OAT	94	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	94	xxxxxxxxxxxxxxxxxx
(5)	100	xxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx
PER RYGR	108	xxxxxxxxxxxxxxxxxxx+	76	xxxxxxxxxxxxxx	0	
(6)	71	xxxxxxxxxxxxx	36	xxxxxxx	0	
ONION	106	xxxxxxxxxxxxxxxxxxx+	73	xxxxxxxxxxxxxx	0	
(8)	93	xxxxxxxxxxxxxxxxxx	57	xxxxxxxxxx	0	
DWF BEAN	104	xxxxxxxxxxxxxxxxxxx+	104	xxxxxxxxxxxxxxxxxxx+	104	xxxxxxxxxxxxxxxxxxx+
(9)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx
FLD BEAN	64	xxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx	150	xxxxxxxxxxxxxxxxxxx+
(10)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx
PEA	71	xxxxxxxxxxxxxx	53	xxxxxxxxxx	106	xxxxxxxxxxxxxxxxxxx+
(11)	100	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx
W CLOVER	100	xxxxxxxxxxxxxxxxxxx	40	xxxxxxxx	20	xxxx
(12)	86	xxxxxxxxxxxxxxxxx	21	xxxx	14	xxx
LUCERNE	138	xxxxxxxxxxxxxxxxxxx+	126	xxxxxxxxxxxxxxxxxxx+	84	xxxxxxxxxxxxxxxxx
(13)	100	xxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx

TRIAL NUMBER 533

PRODIAMINE

SPECIES	0.25 kg/ha		1.00 kg/ha		4.00 kg/ha	
RAPE	107	xxxxxxxxxxxxxxxxxxxx+	107	xxxxxxxxxxxxxxxxxxxx+	102	xxxxxxxxxxxxxxxxxxx
(14)	93	xxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx
KALE	96	xxxxxxxxxxxxxxxxxx	96	xxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx
(15)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxx
SWEDE	124	xxxxxxxxxxxxxxxxxxx+	94	xxxxxxxxxxxxxxxxxx	135	xxxxxxxxxxxxxxxxxxx+
(17)	100	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx	50	xxxxxxxxxx
CARROT	92	xxxxxxxxxxxxxxxxx	138	xxxxxxxxxxxxxxxxxx+	173	xxxxxxxxxxxxxxxxxx+
(18)	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx
LETTUCE	134	xxxxxxxxxxxxxxxxxx+	111	xxxxxxxxxxxxxxxxxx+	63	xxxxxxxxxxxx
(20)	86	xxxxxxxxxxxxxxxx	64	xxxxxxxxxxxx	29	xxxxxx
SUG BEET	135	xxxxxxxxxxxxxxxxxx+	112	xxxxxxxxxxxxxxxxxx+	90	xxxxxxxxxxxxxxxxx
(22)	57	xxxxxxxxxx	43	xxxxxxxxx	29	xxxxxx
BETA VUL	71	xxxxxxxxxxxxxx	88	xxxxxxxxxxxxxxxxx	88	xxxxxxxxxxxxxxxxx
(23)	50	xxxxxxxxxx	36	xxxxxxx	29	xxxxxx
BROM STE	102	xxxxxxxxxxxxxxxxxxx	89	xxxxxxxxxxxxxxxxx	102	xxxxxxxxxxxxxxxxxxx
(24)	100	xxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	57	xxxxxxxxxx
FEST RUB	150	xxxxxxxxxxxxxxxxxxx+	169	xxxxxxxxxxxxxxxxxxx+	37	xxxxxxx
(25)	93	xxxxxxxxxxxxxxxxxx	43	xxxxxxxxx	14	xxx
AVE FATU	100	xxxxxxxxxxxxxxxxxxx	118	xxxxxxxxxxxxxxxxxxx+	88	xxxxxxxxxxxxxxxxxx
(26)	100	xxxxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	29	xxxxxx
ALO MYOS	89	xxxxxxxxxxxxxxxxx	74	xxxxxxxxxxxxxxx	89	xxxxxxxxxxxxxxxxx
(27)	71	xxxxxxxxxxxxxx	57	xxxxxxxxxxx	43	xxxxxxxxx
POA ANN	104	xxxxxxxxxxxxxxxxxxx+	65	xxxxxxxxxxxxx	0	
(28)	64	xxxxxxxxxxxxx	43	xxxxxxxxx	0	

Pre-emergence selectivity test

TRIAL NUMBER 533

PRODIAMINE

SPECIES		0.25 kg/ha	1.00 kg/ha	4.00 kg/ha
POA TRIV	75	xxxxxxxxxxxxxxx	0	0
(29)	50	xxxxxxxxxx	0	0
SIN ARV	124	xxxxxxxxxxxxxxxxxxxx+	114	xxxxxxxxxxxxxxxxxxxx+	119	xxxxxxxxxxxxxxxxxxxx+
(30)	100	xxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx	57	xxxxxxxxxx
RAPH RAP	110	xxxxxxxxxxxxxxxxxxxx+	98	xxxxxxxxxxxxxxxxxxx	98	xxxxxxxxxxxxxxxxxxx
(31)	100	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx	64	xxxxxxxxxxxx
CHRY SEG	85	xxxxxxxxxxxxxxxxx	59	xxxxxxxxxxxx	104	xxxxxxxxxxxxxxxxxxx+
(32)	93	xxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx	50	xxxxxxxxxx
MAT PERF	100	xxxxxxxxxxxxxxxxxxx	97	xxxxxxxxxxxxxxxxxx	117	xxxxxxxxxxxxxxxxxxx+
(33)	100	xxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx	50	xxxxxxxxxx
SEN VULG	118	xxxxxxxxxxxxxxxxxxx+	107	xxxxxxxxxxxxxxxxxxx+	107	xxxxxxxxxxxxxxxxxxx+
(34)	100	xxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx
POL LAPA	112	xxxxxxxxxxxxxxxxxxx+	115	xxxxxxxxxxxxxxxxxxx+	98	xxxxxxxxxxxxxxxxxxx
(35)	86	xxxxxxxxxxxxxxxx	64	xxxxxxxxxxxx	29	xxxxxx
GAL APAR	130	xxxxxxxxxxxxxxxxxxx+	91	xxxxxxxxxxxxxxxxx	39	xxxxxxxx
(38)	86	xxxxxxxxxxxxxxxx	57	xxxxxxxxxx	21	xxxx
CHEN ALB	58	xxxxxxxxxxxx	50	xxxxxxxxxx	29	xxxxxx
(39)	43	xxxxxxxxx	29	xxxxxx	14	xxx
STEL MED	99	xxxxxxxxxxxxxxxxxxx	76	xxxxxxxxxxxxxxx	54	xxxxxxxxxxx
(40)	64	xxxxxxxxxxxxx	43	xxxxxxxxx	29	xxxxxx
VER PERS	111	xxxxxxxxxxxxxxxxxxx+	0		0	
(42)	57	xxxxxxxxxxx	0		0	
VI ARVE	166	xxxxxxxxxxxxxxxxxxx+	83	xxxxxxxxxxxxxxxxx	103	xxxxxxxxxxxxxxxxxxx+
(43)	100	xxxxxxxxxxxxxxxxxxx	50	xxxxxxxxxx	29	xxxxxx

Pre-emergence selectivity test

TRIAL NUMBER 533

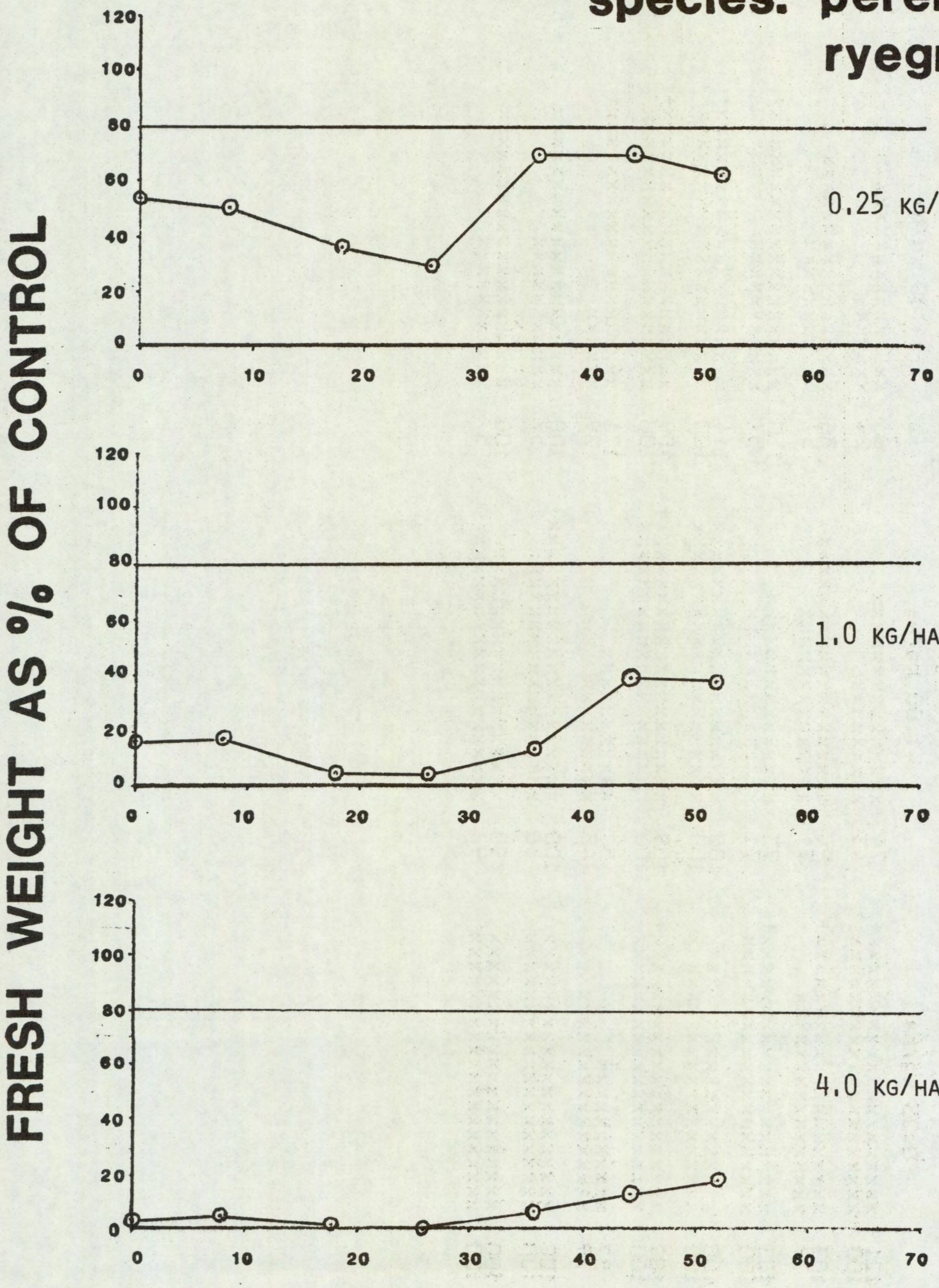
PRODIAMINE

SPECIES		0.25 kg/ha		1.00 kg/ha		4.00 kg/ha
RUM OBTU	121	xxxxxxxxxxxxxxxxxxx+	74	xxxxxxxxxxxxxx	85	xxxxxxxxxxxxxxxx
(44)	100	xxxxxxxxxxxxxxxxxx	43	xxxxxxxxx	29	xxxxxx
EL REPEN	103	xxxxxxxxxxxxxxxxxxx+	94	xxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx
(47)	79	xxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	57	xxxxxxxxxx
ALL VIN	103	xxxxxxxxxxxxxxxxxxx+	75	xxxxxxxxxxxxxx	150	xxxxxxxxxxxxxxxxxxx+
(49)	100	xxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	57	xxxxxxxxxx
CIRS ARV	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	114	xxxxxxxxxxxxxxxxxx+
(50)	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx
TUS FARF	109	xxxxxxxxxxxxxxxxxx+	109	xxxxxxxxxxxxxxxxxx+	109	xxxxxxxxxxxxxxxxxx+
(51)	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx
CONV ARV	57	xxxxxxxxxx	57	xxxxxxxxxx	171	xxxxxxxxxxxxxxxxxx+
(52)	79	xxxxxxxxxxxxxx	43	xxxxxxxx	29	xxxxxx
MAIZE+S	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx
(56)	100	xxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx	57	xxxxxxxxxx
MAIZE	100	xxxxxxxxxxxxxxxxxx	90	xxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx
(57)	100	xxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx	57	xxxxxxxxxx

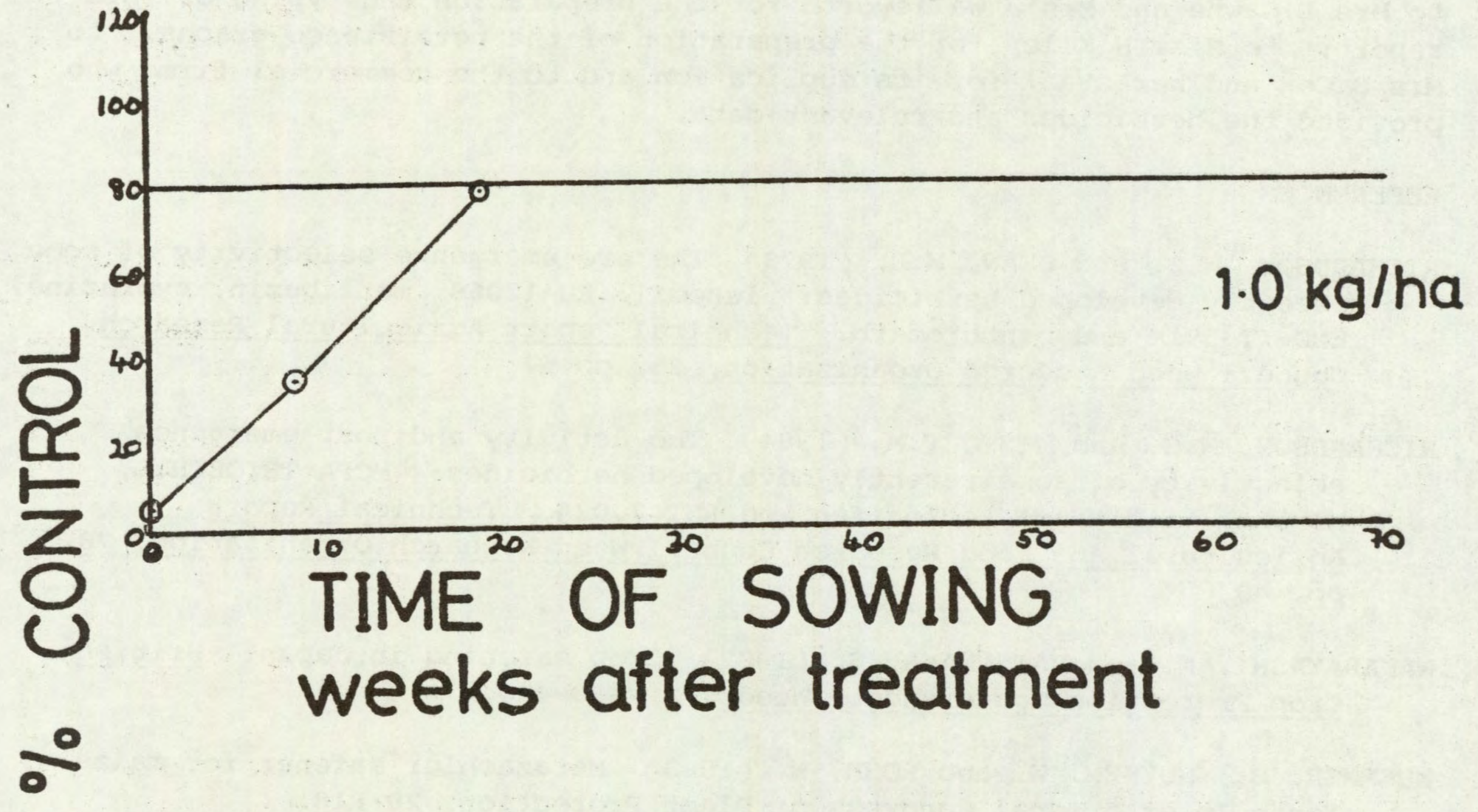
Pre-emergence selectivity test

PERSISTENCE OF PRODIAMINE

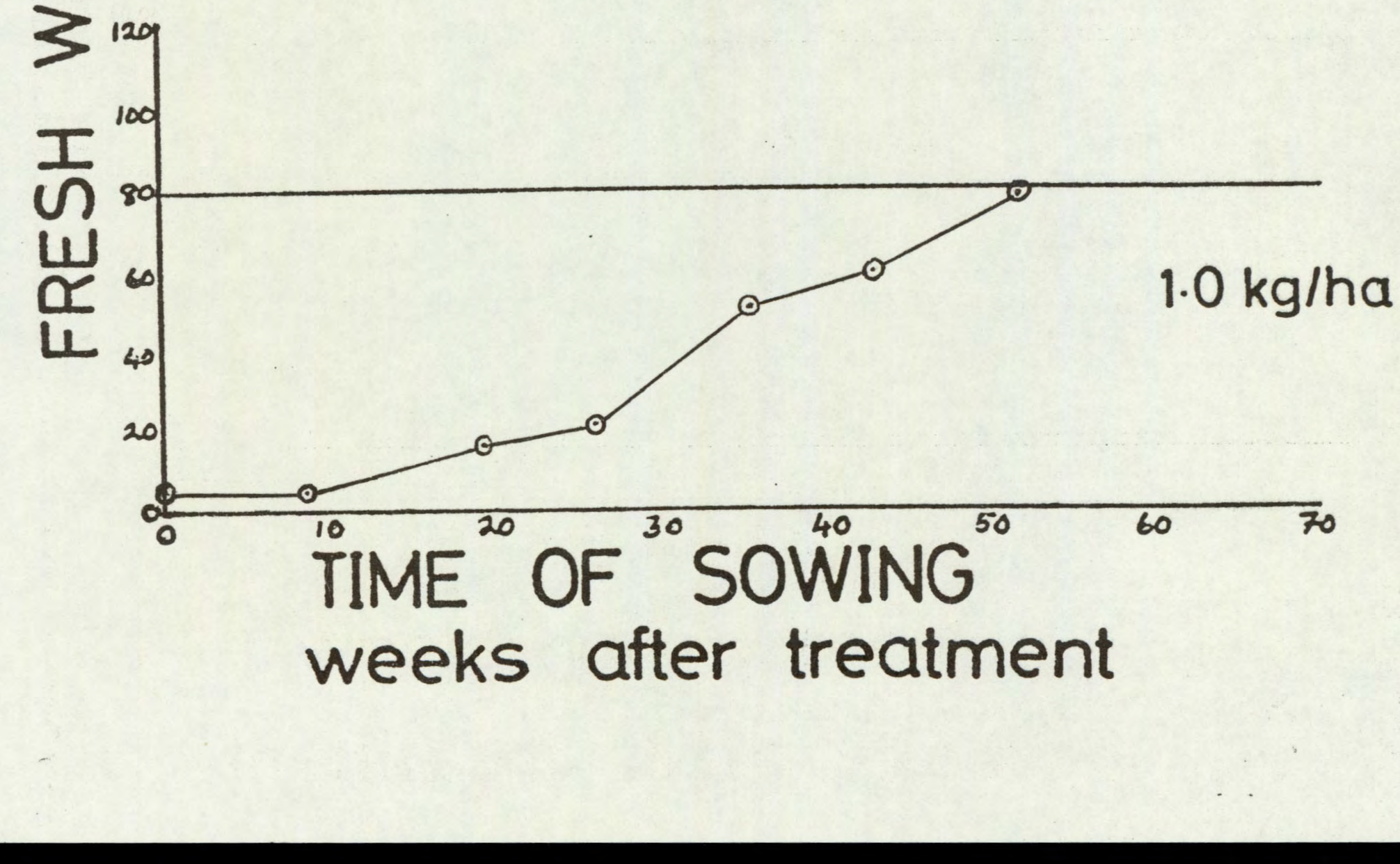
species: perennial ryegrass



PERSISTENCE OF CYANAZINE
species: Perennial Ryegrass



PERSISTENCE OF SIMAZINE
species: Perennial Ryegrass



ACKNOWLEDGEMENTS

We are grateful to the joint Letcombe/WRO Statistics Section for processing the experimental data; to Mr G P White, Miss D Stringer and Messrs R H Webster and R M Porteous for technical and practical assistance; to Mrs L Gawne and Mrs J Wallsworth for the preparation and typing of this report; to Miss N Kiley for the preparation of the persistence graphs; to Mrs S Cox and her staff for its duplication and to the commercial firms who provided the herbicides and relevant data.

REFERENCES

RICHARDSON, W.G. and DEAN, M.L. (1973) The pre-emergence selectivity of some recently developed herbicides: lenacil, RU 12068, metribuzin, cyprazine, EMD-IT 5914 and benthiocarb. Technical Report Agricultural Research Council Weed Research Organization, 25, pp.57.

RICHARDSON, W.G. and WEST, T.M. (1984) The activity and post-emergence selectivity of some recently developed herbicides: MCPA-THIOETHYL, MT-124, tridiphane, aclonifen and RST 20024. Technical Report Agricultural and Food Research Council Weed Research Organization, 78, pp. 48.

WAKABAYASHI, K. and MATSUNAKA, S. (1982) Crop safening in Japan. British Crop Protection Conference - Weeds, 2, 439-450.

WUERZER, B., NUYKEN, W. and ROHR, W. (1983) Metazachlor safener for maize. Tenth International Congress of Plant Protection, 2B-R18.

YOSHIMOTO, T., IGARASHI, R., ENOMOTO, Y., FUNAKOSHI, Y. and FUJITA, T. (1982) MT-124, a new herbicide. Fifth International Congress of Pesticide Chemistry (IUPAC) 1c-15.

Appendix 1. Species, abbreviations, cultivars and stages of growth at assessment

	Designation and computer serial number	Cultivar or source	No. per pot	Depth of planting (cm)	Stage of growth at assessment (untreated controls, leaf numbers exclusive of cotyledons)
Temperate species					
Wheat (Triticum aestivum)	WHEAT (1)	Armada	8	1.0	4 leaves
Wheat + safener	WHEAT + S (2)	Armada	8	1.0	4 tillers
Barley (Hordeum vulgare)	BARLEY (3)	Sonja	8	1.0	3.5-4 leaves, 0-1 tiller
Barley + safener	BARLEY + S (4)	Sonja	8	1.0	3.5-4 leaves, 0-1 tiller
Oat (Avena sativa)	OAT (5)	Pennal	8	1.0	5-5.5 leaves, 0-1 tiller
Perennial ryegrass (Lolium perenne)	PER RYGR (6)	S 23	15	5.0	5-7 leaves, 2 tillers
Onion (Allium cepa)	ONION (8)	Robusta	15	0.5	2-2.5 leaves
Dwarf bean (Phaseolus vulgaris)	DWF BEAN (9)	Masterpiece	4	1.5	2-3 trifoliate leaves
Field bean (Vicia faba)	FLD BEAN (10)	Maris Bead	4	2.0	5 leaves
Pea (Pisum sativum)	PEA (11)	Dark Skinned Perfection	4	1.5	7 leaves
White Clover (Trifolium repens)	W CLOVER (12)	Kent Wild White	20	0.5	Up to 12 trifoliate leaves
Lucerne (Medicago sativa)	LUCERNE (13)	Europe	12	0.5	Up to 4 trifoliate leaves
Rape (Brassica napus oleifera)	RAPE (14)	Jet Neuf	10	0.5	2-4 leaves
Kale (Brassica oleracea acephala)	KALE (15)	Marrowstem	15	0.5	2.5-3 leaves
Swede (Brassica napus)	SWEDE (17)	Acme	10	0.5	3-3.5 leaves

Species	Designation and computer serial number	Cultivar or source	No. per pot	Depth of planting (cm)	Stage of growth at assessment (untreated controls, leaf numbers exclusive of cotyledons)
Carrot (Daucus carota)	CARROT (18)	Chantenay Red Core	10	0.5	2.5-3 leaves
Lettuce (Lactuca sativa)	LETTUCE (20)	Reskia	15	0.5	10 leaves
Sugar beet (Beta vulgaris)	SUG BEET (22)	Nomo	10	1.0	4-6 leavess
Beta vulgaris	BETA VUL (23)	Attleborough 1981	12	0.5	4-6 leaves
Bromus sterilis	BROM STE (24)	WRO 1982	8	0.5	6-8 leaves, 2 tillers
Festuca rubra	FEST RUB (25)	Boreal CDN	25	0.25	11-14 leaves, 2-3 tillers
Avena fatua	AVE FATU (26)	WRO 1980	10	1.0	3.5-4 leaves
Alopecurus myosuroides	ALO MYOS (27)	B and S Supplies 1982	20	0.25	5-5.5 leaves, 1 tiller
Poa annua	POA ANN (28)	B & S Supplies 1978	25	0.5	5-8 leaves, 1-2 tillers
Poa trivialis	POA TRIV (29)	B & S Supplies 1981	25	0.25	6 leaves, 1 tiller
Sinapis arvensis	SIN ARV (30)	WRO 1981	12	0.5	4-6 leaves
Raphanus raphanistrum	RAPH RAP (31)	Long Black Spanish	10	0.5	3.5 leaves
Chrysanthemum segetum	CHRY SEG (32)	WRO 1982	25	surface	4.5 leaves
Matricaria perforata	MAT PERF (33)	WRO 1981	25	surface	Up to 6 leaves
Senecio vulgaris	SEN VULG (34)	B & S Supplies 1981	30	surface	6 leaves
Polygonum lapathifolium	POL LAPA (35)	WRO 1982	20	0.5	Up to 3 leaves
Galium aparine	GAL APAR (38)	Hatherop 1981	12	1.0	6-7 whorls

Species	Designation and computer serial number	Cultivar or source	No. per pot	Depth of planting (cm)	Stage of growth at assessment (untreated controls, leaf numbers exclusive of cotyledons)
Chenopodium album	CHEN ALB (39)	WRO 1979	20	0.5	4-5 leaves
Stellaria media	STEL MED (40)	B & S Supplies 1984	20	0.5	18 leaves
Veronica persica	VER PERS (42)	WRO 1981	15	0.5	Up to 10 leaves
Viola arvensis	VI ARVE (43)	B & S Supplies 1982	25	0.5	Up to 5 leaves
Rumex obtusifolius	RUM OBTU (44)	B & S Supplies 1981	25	0.25	3-4 leaves
Elymus repens	EL REPEN (47)	WRO Clone 31	6*	1.5	6 leaves, 0-1 tiller
Allium vineale	ALL VIN (49)	WRO 1982	12+	1.0	2.5-3 leaves
Cirsium arvense	CIRS ARV (50)	WRO Clone 1	4**	1.5	4-6 leaves
Tussilago farfara	TUS FARF (51)	WRO Clone 1	4*	2.0	4-5 leaves
Convolvulus arvensis	CONV ARV (52)	B & S Supplies 1980	8	0.5	3-5 leaves
Maize + safener (Zea mays)	MAIZE + S (56)	LG 11	5	1.5	4.5 leaves
Maize (Zea mays)	MAIZE (57)	LG 11	5	1.5	4.5 leaves

* One node rhizome fragments
** 4 cm root fragments
\+ Aerial bulbils

ABBREVIATIONS

ångström	Å	freezing point	f.p.
Abstract	Abs.	from summary	F.s.
acid equivalent*	a.e.	gallon	gal
acre	ac	gallons per hour	gal/h
active ingredient*	a.i.	gallons per acre	gal/ac
approximately equal to*	≃	gas liquid chromatography	GLC
aqueous concentrate	a.c.	gramme	g
bibliography	bibl.	hectare	ha
boiling point	b.p.	hectokilogram	hkg
bushel	bu	high volume	HV
centigrade	C	horse power	hp
centimetre*	cm	hour	h
concentrated	concd	hundredweight*	cwt
concentration	concn	hydrogen ion concentration*	pH
concentration x time product	ct	inch	in.
concentration required to kill 50% test animals	LC50	infra red	i.r.
cubic centimetre*	cm^3	kilogramme	kg
cubic foot*	ft^3	kilo ($x10^3$)	k
cubic inch*	in^3	less than	<
cubic metre*	m^3	litre	l.
cubic yard*	yd^3	low volume	LV
cultivar(s)	cv.	maximum	max.
curie*	Ci	median lethal dose	LD50
degree Celsius*	^oC	medium volume	MV
degree centigrade	^oC	melting point	m.p.
degree Fahrenheit*	^oF	metre	m
diameter	diam.	micro ($x10^{-6}$)	μ
diameter at breast height	d.b.h.	microgramme*	μg
divided by*	÷ or /	micromicro (pico: $x10^{-12}$)*	μμ
dry matter	d.m.	micrometre (micron)*	μm (or μ)
emulsifiable concentrate	e.c.	micron (micrometre)*†	μm (or μ)
equal to*	=	miles per hour*	mile/h
fluid	fl.	milli ($x10^{-3}$)	m
foot	ft	milliequivalent*	m.equiv.
		milligramme	mg
		millilitre	ml

† The name micrometre is preferred to micron and μm is preferred to μ.

millimetre*	mm
millimicro* (nano: $x10^{-9}$)	n or mμ
minimum	min.
minus	-
minute	min
molar concentration*	M (small cap)
molecule, molecular	mol.
more than	>
multiplied by*	x
normal concentration*	N (small cap)
not dated	n.d.
oil miscible concentrate	o.m.c. (tables only)
organic matter	o.m.
ounce	oz
ounces per gallon	oz/gal
page	p.
pages	pp.
parts per million	ppm
parts per million by volume	ppmv
parts per million by weight	ppmw
percent(age)	%
pico (micromicro: $x10^{-12}$)	p or μμ
pint	pint
pints per acre	pints/ac
plus or minus*	±
post-emergence	post-em
pound	lb
pound per acre*	lb/ac
pounds per minute	lb/min
pound per square inch*	lb/in^2
powder for dry application	p. (tables only)
power take off	p.t.o.
precipitate (noun)	ppt.
pre-emergence	pre-em.
quart	quart
relative humidity	r.h.
revolution per minute*	rev/min
second	s
soluble concentrate	s.c.
soluble powder	s.p.
solution	soln
species (singular)	sp.
species (plural)	spp.
specific gravity	sp. gr.
square foot*	ft^2
square inch	in^2
square metre*	m^2
square root of*	$\sqrt{}$
sub-species*	ssp.
summary	s.
temperature	temp.
ton	ton
tonne	t
ultra-low volume	ULV
ultra violet	u.v.
vapour density	v.d.
vapour pressure	v.p.
varietas	var.
volt	V
volume	vol.
volume per volume	v/v
water soluble powder	w.s.p. (tables only)
watt	W
weight	wt
weight per volume*	w/v
weight per weight*	w/w
wettable powder	w.p.
yard	yd
yards per minute	yd/min

* Those marked * should normally be used in the text as well as in tables etc.

WEED RESEARCH ORGANIZATION

TECHNICAL REPORTS

(Price includes surface mail; airmail £2.00 extra)

(* denotes Reports now out of print)

6. The botany, ecology, agronomy and control of Poa trivialis L. rough-stalked meadow-grass. November 1966. G P Allen. Price - £0.25

7. Flame cultivation experiments 1965. October 1966. G W Ivens. Price - £0.25

8. The development of selective herbicides for kale in the United Kingdom. 2. The methylthiotriazines. Price - £0.25

10. The liverwort, Marchantia polymorpha L. as a weed problem in horticulture; its extent and control. July 1968. I E Henson. Price - £0.25

11. Raising plants for herbicide evaluation; a comparison of compost types. July 1968. I E Henson. Price - £0.25

*12. Studies on the regeneration of perennial weeds in the glasshouse; I. Temperate species. May 1969. I E Henson. Price - £0.25

13. Changes in the germination capacity of three Polygonum species following low temperature moist storage. June 1969. I E Henson. Price - £0.25

14. Studies on the regeneration of perennial weeds in the glasshouse. II. Tropical species. May 1970. I E Henson. Price - £0.25

15. Methods of analysis for herbicide residues. February 1977. (second edition). Price - £5.75

16. Report on a joint survey of the presence of wild oat seeds in cereal seed drills in the United Kingdom during spring 1970. November 1970. J G Elliott and P J Attwood. Price - £0.25

17. The pre-emergence selectivity of some newly developed herbicides, Orga 3045 (in comparison with dalapon), haloxydine (PP 493), HZ 52.112, pronamide (RH 315) and R 12001. January 1971. W G Richardson, C Parker and K Holly. Price - £0.25

18. A survey from the roadside of the state of post-harvest operations in Oxfordshire in 1971. November 1971. A Phillipson. Price - £0.25

*19. The pre-emergence selectivity of some recently developed herbicides in jute, kenaf and sesamum, and their activity against Oxallis latifolia. December 1971. M L Dean and C Parker. Price - £0.25

* 20. A survey of cereal husbandry and weed control in three regions of England. July 1972. A Phillipson, T W Cox and J G Elliott. Price - £0.35

21. An automatic punching counter. November 1972. R C Simmons. Price - £0.30

22. The pre-emergence selectivity of some newly developed herbicides: bentazon, BAS 3730H, metflurazone, SAN 9789, HER 52.123, U 27,267. December 1972. W G Richardson and M L Dean. Price - £0.25

23. A survey of the presence of wild oats and blackgrass in parts of the United Kingdom during summer 1972. A Phillipson. Price - £0.25

24. The conduct of field experiments at the Weed Research Organization. February 1973. J G Elliott, J Holroyd and T O Robson. Price - £1.25

25. The pre-emergence selectivity of some recently developed herbicides: lenacil, RU 12068, metribuzin, cyprazine, EMD-IT 5914 and benthiocarb. August 1973. W G Richardson and M L Dean. Price - £1.75.

26. The post-emergence selectivity of some recently developed herbicides: bentazon, EMD-IT 6412, cyprazine, metribuzin, chlornitrofen, glyphosate, MC 4379, chlorfenprop-methyl. October 1973. W G Richardson and M L Dean. Price - £3.31

27. Selectivity of benzene sulphonyl carbamate herbicides between various pasture grasses and clover. October 1973. A M Blair. Price - £1.05

28. The post-emergence selectivity of eight herbicides between pasture grasses: RP 17623, HOE 701, BAS 3790, metoxuron, RU 12068, cyprazine, MC 4379, metribuzin. October 1973. A M Blair. Price - £1.00

* 29. The pre-emergence selectivity between pasture grasses of twelve herbicides: haloxydine, pronamide, NC 8438, Orga 3045, chlortoluron, metoxuron, dicamba, isopropalin, carbetamide, MC 4379, MBR 8251 and EMD-IT 5914. November 1973. A M Blair. Price - £1.30

30. Herbicides for the control of the broad-leaved dock (Rumex obtusifolius L.). November 1973. A M Blair and J Holroyd. Price - £1.06

31. Factors affecting the selectivity of six soil acting herbicides against Cyperus rotundus. February 1974. M L Dean and C Parker. Price - £1.10

32. The activity and post-emergence selectivity of some recently developed herbicides: oxadiazon, U-29,722, U-27,658, metflurazone, norflurazone, AC 50-191, AC 84,777 and iprymidam. June 1974. W G Richardson and M L Dean. Price - £3.62

33. A permanent automatic weather station using digital integrators. September 1974. R C Simmons. Price £0.63.

34. The activity and pre-emergence selectivity of some recently developed herbicides: trifluralin, isopropalin, oryzalin, dinitramine, bifenox and perfluidone. November 1974. W G Richardson and M L Dean. Price - £2.50

35. A survey of aquatic weed control methods used by Internal Drainage Boards, 1973. January 1975. T O Robson. Price - £1.39

36. The activity and pre-emergence selectivity of some recently developed herbicides: Bayer 94871, tebuthiuron, AC 92553. March 1975. W G Richardson and M L Dean. Price - £1.54

37. Studies on Imperata cylindrica (L.) Beauv. and Eupatorium odoratum L. October 1975. G W Ivens. Price - £1.75

38. The activity and pre-emergence selectivity of some recently developed herbicides: metamitron, HOE 22870, HOE 23408, RH 2915, RP 20630. March 1976. W G Richardson, M L Dean and C Parker. Price - £3.25

39. The activity and post-emergence selectivity of some recently developed herbicides: HOE 22870, HOE 23408, flamprop-methyl, metamitron and cyperquat. May 1976. W G Richardson and C Parker. Price - £3.20

40. The activity and pre-emergence selectivity of some recently developed herbicides: RP 20810, oxadiazon, chlornitrofen, nitrofen, flamprop--isopropyl. August 1976. W G Richardson, M L Dean and C Parker. Price - £2.75.

41. The activity and pre-emergence selectivity of some recently developed herbicides: K 1441, mefluidide, WL 29226, epronaz, Dowco 290 and triclopyr. November 1976. W G Richardson and C Parker. Price - £3.40.

42. The activity and post-emergence selectivity of some recently developed herbicides: KUE 2079A, HOE 29152, RH 2915, Triclopyr and Dowco 290. March 1977. W G Richardson and C Parker. Price - £3.50

43. The activity and pre-emergence selectivity of some recently developed herbicides: dimefuron, hexazinone, trifop-methyl, fluothiuron, buthidazole and butam. November 1977. W G Richardson and C Parker. Price - £3.75.

44. The activity and selectivity of the herbicides: ethofumesate, RU 12709 and isoproturon. December 1977. W G Richardson, C Parker, & M L Dean. Price - £4.00

45. Methods of analysis for determining the effects of herbicides on soil soil micro-organisms and their activities. January 1978. M P Greaves, S L Cooper, H A Davies, J A P Marsh & G I Wingfield. Price - £4.00

46. Pot experiments at the Weed Research Organization with forest crop and weed species. February 1978. D J Turner and W G Richardson. Price - £2.70

47. Field experiments to investigate the long-term effects of repeated applications of MCPA, tri-allate, simazine and linuron - effects on the quality of barley, wheat, maize and carrots. July 1978. J D Fryer, P D Smith and J W Ludwig. Price - £1.20.

48. Factors affecting the toxicity of paraquat and dalapon to grass swards. March 1978. A K Oswald. Price - £2.90

49. The activity and post-emergence selectivity of some recently developed herbicides: NP 48, RH 5205 and Pyridate. May 1978. W G Richardson and C Parker. Price - £2.50

50. Sedge weeds of East Africa - II. Distribution. July 1978. P J Terry. Price - £1.50

51. The activity and selectivity of the herbicides methabenzthiazuron, metoxuron, chlortoluron and cyanazine. September 1978. W G Richardson and C Parker. Price - £2.20.

52. Antidotes for the protection of field bean (Vicia faba L.) from damage by EPTC and other herbicides. February 1979. A M Blair. Price - £1.35

53. Antidotes for the protection of wheat from damage by tri-allate. February 1979. A M Blair. Price - £2.00

54. The activity and pre-emergence selectivity of some recently developed herbicices: alachlor, metolachlor, dimethachlor, alloxydim-sodium and fluridone. April 1979. W G Richardson and C Parker. Price - £3.00

55. The activity and selectivity of the herbicides carbetamide, methazole, R 11913 and OCS 21693. May 1979. W G Richardson and C Parker. Price - £1.80

56. Growing weeds from seeds and other propagules for experimental purposes. July 1979. R H Webster. Price - £1.10

57. The activity and pre-emergence selectivity of some recently developed herbicides: R 40244, AC 206784, pendimethalin, butralin, acifluorfen and FMC 39821. December 1979. W G Richardson, T M West and C Parker - Price - £3.55

58. The tolerance of fenugreek (Trigonella foenumgraecum L.) to various herbicides. December 1979. W G Richardson. Price - £1.55

59. Recommended tests for assessing the side-effects of pesticides on the soil microflora. April 1980. M P Greaves, N J Poole, K H Domsch, G Jagnow and W Verstraete. Price - £2.00

60. Properties of natural rainfalls and their simulation in the laboratory for pesticide research. September 1980. R C Simmons. Price - £1.25

61. The activity and post-emergence selectivity of some recently developed herbicides: R 40244, DPX 4189, acifluorfen, ARD 34/02 (NP 55) and PP 009. November 1980. W G Richardson, T M West and C Parker. Price - £3.75

62. The activity and pre-emergence selectivity of some recently developed herbicides: UBI S-734, SSH-43, ARD 34/02 (= NP 55), PP 009 and DPX 4189. February 1981. W G Richardson, T M West and C Parker. Price - £3.50

63. The activity and post-emergence selectivity of some recently developed herbicides: SSH-41, MB 30755, AC 213087, AC 222293 and Dowco 433. May 1981. W G Richardson, T M West and C Parker. Price - £3.50

64. The activity and pre-emergence selectivity of some recently developed herbicides: chlomethoxynil, NC 20484 and MBR 18337. March 1982. W G Richardson, T M West and C Parker. Price - £3.00

65. A system for monitoring environmental factors in controlled environment chambers and glasshouses. June 1982. R C Simmons. Price - £1.50

66. The activity and pre-emergence selectivity of some recently developed herbicides: AC 213087 and AC 222293. December 1982. W G Richardson, T M West and C Parker. Price - £2.00

67. The activity and post-emergence selectivity of some recently developed herbicides: trifopsime, glufosinate, RH 8817, MBR 18337 and NC 20484. December 1982. W G Richardson, T M West and C Parker. Price - £3.25

68. The activity and pre-emergence selectivity of some recently developed herbicides: WL 49818, WL 82830, WL 83627, WL 83801 and DPX 5648. December 1982. W G Richardson, T M West and C Parker. Price - £4.00

69. The activity and late post-emergence selectivity of some recently developed herbicides: AC 252925, DOWCO 453, HOE 33171 and HOE 35609. March 1983. W G Richardson, T M West and G P White. Price - £3.25

70. The potential of various herbicides for selective control of weed grasses and Stellaria media in newly sown ryegrass/clover leys and ryegrass seed crops. May 1983. F W Kirkham Price - £1.75

71. A feasibility study of the use of chemicals for rural amenity areas. Sponsored by the Countryside Commission. September 1983. E J P Marshall Price - £5.00

72. The activity and late post-emergence selectivity of FBC 32197. November 1983. W G Richardson, T M West and G P White. Price - £1.25

73. Paraquat persistence - statistical analysis of the WRO long term trial. January 1984. R J Hance, T H Byast, P D Smith and T M Weight. Price - £1.00

74. The activity and post-emergence selectivity of some recently developed herbicides: AC 252214, DPX-T6376, and chlorazifop. February 1984. W G Richardson, T M West and G P White. Price - £2.00.

75. The effect of temperature and soil moisture on the activity of isoproturon and chlortoluron on Alopecurus myosuroides and winter wheat. May 1984. A M Blair. Price - £2.00

76. A laboratory rainfall simulator for pesticide studies. May 1984. R C Simmons. Price - £2.00

77. Experiments on the effects of the herbivorous fish, grass carp (Ctenopharyngodon idella Val.) on aquatic vascular plants, algae, zooplankton and phytoplankton and the importance of water temperature on the success of weed control. September 1984. M C Fowler. Price - £3.50.

78, The activity and post-emergence selectivity of some recently developed herbicides: MCPA-thioethyl, MT-124, tridiphane, aclonifen and RST 20024 H. October 1984. W G Richardson and T M West. Price - £5.40

79. A preliminary study on the effect of some agricultural herbicides on a range of field margin flora. November 1984. J E Birnie. Price - £2.50

80. The activity and pre-emergence selectivity of some recently developed herbicides: imazaquin, isoxaben, metsulfuron-methyl, aclonifen and orbencarb. December 1984. W G Richardson and T M West. Price - £6.50

81. The side effects of alloxydim sodium, sethoxydim, acifluorfen and fluazifop-butyl on legume growth and nodulation. January 1985. J M Bebb, M P Greaves and W G Richardson. Price - £3.00

82. An IRGA system for continuous monitoring of CO_2 and H_2O vapour exchange in replicate plants growing in controlled environments. January 1985. C R Merritt and R C Simmons. Price - £3.00

83. A laboratory pot sprayer for use with controlled environment chambers. February 1985. R C Simmons and J A Drinkwater. Price - £2.50

84. Maps of the changes in the weeds of Boddington Barn field over twenty years (1961-1981). March 1985. R J Chancellor. Price - £4.50

85. The use of bentazone and pyridyl herbicides alone and in mixtures for the control of creeping thistle (Cirsium arvense L.) in grassland. April 1985. W G Richardson, A K Oswald and T M West. Price - £1.50

86. The activity and pre-emergence selectivity of some recently developed herbicides: metazachlor, butamifos, MT-124, tridiphane, MK 616 and prodiamine. May 1985. W G Richardson and T M West. Price - £7.00.